EIA SYSTEMS ENGINEERING
MANAGEMENT PLAN (SEMP) TEMPLATE*

The SEMP contains the following sections. unless they have been tailored out. Cross references to detailed information in related technical plans is included in each pertinent SEMP paragraph. When it is essential to the planning and conduct of the systems engineering effort, the SEMP may include other information in addition to that in the following subparagraphs.

1. Scope

This section of the SEMP includes a brief description of the purpose of the system to which this SEMP applies and a summary of the purpose and content of the SEMP. This statement needs to be in the scope: "This SEMP is the plan for the complete, integrated technical effort and incorporates all tasks to be conduced as a part of that effort. Notwithstanding any provision of this SEMP, nothing herein shall relieve the performing activity of meeting the performance, cost, and schedule requirements of the Contract."

1.1 Technical Plan Summary

This section contains an executive summary, with reference to the detailed plan, in the pertinent location, for all technical plans required by the tasking activity. It also includes cross references to appropriate non-technical plans which interface with the systems engineering effort. This section contains a summary description of how the technical activities covered in other plans are accomplished as fully integrated pans of the technical effort.

2. Applicable Documents

This section of the SEMP lists the documents applicable to SEMP implementation. The SEMP references or incorporates the definitions of Appendix A (Glossary) of this standard.

3. Systems Engineering Process

This section of the SEMP contains a description of the performing activity's systems engineering process activities to be accomplished.. This section addresses the iterative nature of the process application and other process implementation features including:

a. Organizational responsibilities and authority for systems engineering pursuits and tasks. including control of subcontracted engineering

b. Tasks to satisfy each of the accomplishment criteria identified in the performing activity's Systems Engineering Master Schedule (SEMS) and their relationship to the performing activity's Systems Engineering Detailed Schedule (SEDS)

c. Narratives, supplemented as necessary by graphical presentations, detailing the performing activity's plans, processes, and procedures for the execution of the systems engineering effort.

3.1 Systems Engineering Process Planning

This section addresses key program technical objectives, products, and expected results from the process, needed process inputs, and work breakdown structure development.

a. _Major products and results of the process._ This section contains a description of major products and results both for the tasking activity and for internal use within the performing activity program as a result of the systems engineering process activities.

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* Adapted from: EIA, (December 1994), "EIA/IS 632, _Systems Engineering_," Appendix B.

(1) Decision Data Base. *(This section contains a description of the development, implementation, life-cycle accessibility, and life-cycle maintenance of the decision data base, including a description of how traceability of the information will be accomplished.)*

(2) Specifications and Configuration Baselines. *(This section contains the plan to generate specifications and configuration baselines, measures of completeness, verifiability, and traceability as well as how and when they will be controlled.)*

b. _Process inputs._ This section contains an explanation of the depth of information detail needed to be able to accomplish the activities of the systems engineering process, how needed information will be acquired when not available in tasking activity documents provided, and how conflicts in information provided will be resolved.

c. _Technical objectives._ This section contains a description of the technical objectives and their relationship to cost, schedule, performance, and risk.

d. _Work Breakdown Structure (WBS)._ This section contains a description of the development and implementation of the WBS including the relationship between the specification tree and of other tasks required to form a complete WBS will be assured. The methods of time phasing of work breakdown structures, development and control of work packages, development of planning packages and their conversion to work packages, size of work packages, resource use traceability to work breakdown structure and organizational structure, and integration to scheduling and critical path identification is to be included. (if this information is required elsewhere by the tasking activity, do not duplicate reporting but provide a cross reference to the specific items requested.)

e. _Training._ This section contains a description of the method by which both internal and external training for performing activity and tasking activity personnel is done. The plan may include analysis results of performance or behavior deficiencies or shortfalls, required training to remedy, and schedules to achieve required proficiencies.

f. _Standards and procedures._ This section contains a description of standardization documents and procedures that the program will follow and implementation of standardization tasking into the pertinent sections of the systems engineering process.

g. _Resource allocation._ This section contains a description of the technical basis and rationale for resource allocation to program technical tasks. This section may include resource requirements identification, procedures for resource control, and reallocation procedures. (of this information is required elsewhere by the tasking activity, do not duplicate reporting but provide a cross reference to the specific items requested.)

h. _Constraints._ This section contains a description of major constraints on the program. Constraints are limitations or restrictions a program will observe and include areas of funding, personnel, facilities, manufacturing capability, critical resources, or other constraining resource.

i. _Work authorization._ This section contains a description of the method by which work packages are initiated (opened) and the criteria for their close out as well as the method by which changes to the content of work packages will be authorized. (If Us information is required elsewhere by the tasking activity, do n at duplicate reporting but provide a cross reference to the specific items requested.)

j. _Verification Planning._ This section contains a description of the verification planning for all requirements. This may include identification and configuration control of verification tools.

k.   *Subcontractor technical effort.* This section contains a description of the level of subcontractor participation in the technical effort as well as of the systems engineering role in subcontractor/ supplier selection and control.

3.2 Requirements Analysis

This section contains a description of the methods, procedures, and tools for analysis of missions and environments; identification of requirements for development, manufacturing, verification, deployment, operations, support. training, and disposal; and determination of design constraint requirements. This section also documents the approach and methods used to define the performance and functional requirements for the following areas. *(Note: Some areas may impact requirements analysis only after synthesis efforts identify solution alternatives. As such. some of the descriptive information may be more appropriately covered under other systems engineering process elements).*

a.   Reliability
b.   Maintainability
c.   Survivability
d.   Electromagnetic Compatibility, Radio Frequency Management, and Electrostatic Discharge
e.   Human Engineering and Human Systems Integration
f.   Safety and Health Hazards
g.   System Security
h.   Producibility
i.   Supportability and Product Support
j.   Test and Evaluation
k.   Testability and Integrated Diagnostics
l.   Transportability
m.   Infrastructure Support
n.   Other Areas of System Functionality. *(This section addresses any other areas bearing on the determination of performance and functional requirements for the system.)*

3.3 Functional Analysis/Allocation

This section contains a description of the approach. methods, procedures, and tools to perform functional analysis/allocation. A discussion is included on integrating factor dependent approaches and methods for the tasks identified in 3.2a through 3.2n into functional analysis/allocation.

3.4 Synthesis

This section contains a description of the approach, methods, procedures, and tools to perform synthesis. A discussion is included on integrating into synthesis:

a.   Factor-dependent approaches and methods for tasks identified in 3.2a through 3.2n

b.   The use of leveraged options, such as commercial-off-the-shelf, non-developmental items, open systems architecture, re-use, and commercial/government-use technologies.

3.5 Systems Analysis and Control

This section addresses the approach, methods, procedures, and tools that the performing activity plans to utilize for systems analysis and control. This includes the integration of factor-dependent approaches and methods for the items identified in 3.2a through 3.2n into systems analysis and control. Further, this section contains the plans to integrate into systems analysis and control the pervasive development considerations of:

a.   Computer resources risk management

b.　Use of simulations (e.g., integration laboratories, mathematical models, virtual reality, etc.)

c.　Use of prototyping (including by simulation) to assist in identifying and reducing risks

d.　Materials, processes, and parts control

e.　Digital data

3.5.1　Systems analysis.　This section contains a description of the specific systems analysis efforts needed including methods, procedures, and tools necessary for their conduct.

a.　_Trade Studies._　This section includes a description of planned trade studies and necessary source data.

b.　_System and Cost Effectiveness Analyses._　This section includes a description of the system and cost effectiveness analysis effort and its role as an integral part of the systems engineering process.　This section includes a description of the implementation of system and cost effectiveness analyses to support the development of life-cycle balanced products and processes and to support risk management activities.　This section contains a description of the Measures of Effectiveness (MOE), how the MOEs interrelate (such as a MOE hierarchy), and criteria for the selection of additional MOEs to support the evolving definition and verification of the system.　This section contains a description of the overall approach for system and cost effectiveness analysis as well as manufacturing analysis, verification analysis, deployment analysis, operational analysis, supportability analysis, training analysis, disposal analysis, environmental analysis and life cycle cost analysis.　A description is included on how analyses will be partitioned into the various areas, if they cannot be conducted integrally, and how analytic results will be integrated.

c.　_Risk Management._　This section includes a description of the risk management program to cover:

　(1)　Approach and criteria for risk identification, prioritization, sensitivity assessment, handling and risk impact integration into decision processes

　(2)　The risks associated with the developmental test and evaluation requirements

　(3)　Plans to handle technical risk (e.g., additional prototyping, technology and integration verification, back-up development)

　(4)　Risk control and monitoring measures including special verifications, technical performance measurement, and critical milestones

　(5)　Description of the method for relating TPM, SEMS, and SEDS to cost and schedule performance measurement and the relationship to the Work Breakdown Structure.

3.5.2　Control.　This section of the SEMP contains a description of the specific control mechanisms needed, including methods, procedures, and tools.

a.　_Configuration Management (CM)._　This section includes a description of the approach planned to establish and maintain configuration control of identified system products and processes (when a CM plan is separately required, reference to appropriate sections of the plan will suffice).

b. *Interface Management.* This section includes a description of the approach planned to establish and maintain interface control within contractual responsibility and support activities to ensure that external interfaces are managed and controlled.

c. *Data Management.* This section includes a description of the approach planned to establish and maintain a data management system. This section contains a description of how and which technical documentation will be controlled and the method of documentation of program engineering and technical information. (Do not duplicate 3.1.a.(1)).

d. *Systems Engineering Master Schedule (SEMS).* This section includes a description of the analysis used to derive the SEMS and the supporting Systems Engineering Detailed Schedule (SEDS) and their structure.

e. *Technical Performance Measurement (TPM).* This section includes a description of the approach planned for establishing, maintaining, and reporting results of TPM (see 9.1) which are responsive to requirements, technical parameters identified by the tasking activity, and requirements in the SEMS. This section includes the following:

   (1) TPM update frequencies, level of tracking depth, and response time to generate recovery plans and planned profile revisions

   (2) Technical parameters selected for tracking including related risks

   (3) Depiction of relationships between the selected critical parameter and those lower-level parameters that need to be measured to determine the critical parameter achievement value with each parameter correlated to their Work Breakdown Structure (WBS) element

   (4) Conditions of measurement (type of test, simulation. analysis, demonstration, or estimate; environment; and constraints on measurement).

f. *Technical Reviews.* This section includes a description of the approach planned to establish and conduct technical reviews. This includes how compliance with performance and design requirements will be determined; how discrepancies identified as not meeting requirements Will be handled; and how system products and processes assessed to have a moderate to high risk of compliance are to be addressed in order to comply with the contract/agreement, SEMS, and success criteria prior to conducting a review.

g. *Supplier Control.* This section includes a description of the technical management of suppliers and subcontractors including integration of their technical efforts and data into the overall systems engineering efforts and the integration of subcontractor data into the decision data base.

h. *Requirements Traceability.* This section includes a description of the approach planned to establish and maintain requirements traceability between systems engineering process activities, work breakdown structures, technical data management system and correlation, as pertinent, with the SEMS and the SEDS. The traceability of requirements through the data management system is described.

4. Transitioning Critical Technologies

This section contains a description of the activities, associated risks, and criteria for assessing and transitioning technologies, including those for transitioning critical technologies from technology development and demonstration programs. When moderate to high risk technologies are assessed as required to meet performance and functional requirements, the performing activity includes a description of how alternatives will be identified and selection criteria established to determine the

conditions under which any alternative would be incorporated into the product. This section contains a description of the planned method for engineering and technical process improvement including procedures for establishing preplanned product improvement or evolutionary development, as pertinent to the life-cycle phase.

5. Integration of the Systems Engineering Effort

This section of the SEMP contains a description of:

a. How the various inputs will be integrated into a coordinated systems engineering effort that meets cost, schedule, and performance objectives, including how the technical effort of subcontractors and vendors is integrated

b. How the performing activity will organizationally support the systems engineering effort, including how multidisciplinary teamwork will be achieved

c. Major responsibilities and authority in conducting systems engineering efforts, to include present and planned program technical staffing

d. Planned personnel needs by discipline and level of expertise, and human resource loading

e. Use of methods to support design integration, (e. g., integrated computer-aided tool sets, management information systems).

6. Implementation Tasks

This section contains a description of required implementation tasks including:

a. Technology verifications

b. Process proofing

c. Manufacturing of engineering test articles; d. development test and evaluation

d. Generation and re-use of software for system end-items

e. Sustaining engineering and problem solution support

f. Other systems engineering implementation tasks.

7.   Additional systems engineering activities

His section of the SEMP contains a description of other areas not specifically included in previous sections but that are essential for proper planning and conduct of the systems engineering effort.

7.1 Long-lead Items

This section contains a description of the process by which long-lead items that affect the critical path of the program are defined/determined.

7.2 Engineering Tools

This section contains a description of systems engineering tools which will be used on the program as well as the reliance on them and control of them:

a.   Analysis tools
b.   Synthesis tools
c.   Control tools
d.   Reference tools
e.   Simulation tools
f.   Laboratory and other facility tools.

7.3 Design to Cost

This section addresses design to cost requirements with emphasis on how they are allocated as well as how compliance is determined and controlled.

7.4 Value Engineering

This section contains a description of the value engineering effort and how it will be implemented and administered.

7.5 System Integration

This section contains a description of the approach for the integration and assembly of the system with emphasis on risk management and continuing verification of all external and internal interfaces (physical, functional, and logical).

7.6 Other Methods and Controls

This section contains a description of any other methods and controls that the contractor or subcontractor personnel will use in the technical effort.

8. Notes

This section of the SEMP contains:

a. Any general information that aids in understanding the SEMP (e.g., background information. glossary)

b. An alphabetical listing of all acronyms and abbreviations, with meanings as used in the SEMP.

9. Appendixes

Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, sensitive data) or for ease of use. Each such appendix is referenced in the main body of the SEMP where the data would normally have been provided. If designated to be made available to the tasking activity, each appendix is designated as to whether it requires tasking activity approval prior to implementation, or whether it is provided as "Information Only."

9.1 Technical Performance Measurement Appendix

This appendix is not for approval since it will contain the actual tracking data for each parameter (see 3.5.2e). It contains the following data for each parameter to be tracked:

a. Specification requirement, technical objective, other requirement, or measure of effectiveness

b. Time-phased planned value profile with a tolerance band (error budget). The planned value profile represents the expected trend of the parameter over the subsystem development life cycle. The boundaries of the tolerance band represents estimated inaccuracies at the time of the estimate, and indicate the region within which it is expected that the specification requirement will be achieved with allocated resources and SEMS/SEDS events and milestones.

c. The risks associated with achieving the planned value profile

d. Program events significantly related to the achievement of the planned value profile (e.g., technical reviews).